Art. I.—*A Revision of the genus Gymnorhina.*

By ROBERT HALL.

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The warrant for the acceptance of the species of this genus appears to be as follows:—The white-backed species is different from the black-backed species in the region of the back. The Lesser white-backed species is said to be smaller than the white-backed. The long-billed species is said to have a longer and slenderer bill than any other of this genus. Thus, briefly, we have the leading characters of the four species of this Australian genus.

Just as G. tibicen, Lath., of the interior of New South Wales, is found to be smaller than the representatives of the same species along the coast of that colony, so does G. hyperleuca, Gld., of Tasmania, compare with G. leuconota, Gld., which is defined by Dr. Gadow[1] as a smaller race of the mainland species. G. tibicen I make a variety of G. leuconota, as intermediate links exhibited will show, or to place it in the way suggested above, G. leuconota is the larger and more developed race of G. tibicen. This latter species appears to me to be the intermediate phase between an extinct piping-crow, and the present whole-white-backed piping-crow or magpie.

In dimensions, certain specimens of G. leuconota show the bill and body to have the same measurements as those of G. hyperleuca on the one side, and of G. dorsalis, Campbell, on the other. Although the slender bill of G. dorsalis, and the shorter one of G. hyperleuca may stand as leading characters in a large number of specimens, they fail to do so in a small number. There are numerous specimens of G. tibicen and G. leuconota that will not answer to any key to the species of Gymnorhina yet given. Each appears to show reversion or hybridism upon the back for the one part and want of agreement with recognised measurements on the other, and this is especially so in the case of the

[1] Brit. Mus. Cat. Bds., vol. viii., p. 93 (1883).

bill. In reality, as I see it, the specimens of G. tibicen show an advance in plumage development by losing nearly all of the black saddle in favour of a "white-back," while certain of those of G. leuconota have undergone reversion, in part, to the present day "black-back." Specimens by measurement connect the two. It is particularly interesting to see in specimens of the fledglings of G. dorsalis, the nearest approach to what appears to me as the original uniform black type.

The principal plumage-phases of all the Gymnorhinae appear in G. dorsalis.

(1). We have the fledgling shewing two phases—one, apparently a relic of an early ancestor of the various existing magpies, with the back almost black, or more or less slightly pied, from the nape to the upper tail coverts, both of these narrow regions being pure white; and the second with a very small amount of black upon a nearly pure white back.

(2). The saddle-back of G. tibicen, slightly greyer in colour, is shewn in an immature male bird found to be breeding.

(3). A pure white-back in the adult of each sex.

At Bacchus Marsh, Victoria, the hybrid-like birds of G. leuconota are plentiful, as Messrs. C. C. and T. A. Brittlebank have observed; while at Western Port, Victoria, they are less so. At Horsham, Victoria, the hybrid-like phase of G. tibicen is plentiful, while whole white-backs are found breeding in the same district and have been shot from the same flocks. Just as a black-backed phase of G. dorsalis has been observed in Western Australia, by the writer, to be mated with a whole white-back, so has the same been noted with G. tibicen and G. leuconota (judging by the backs alone) in the Wimmera. One female bird procured at Essendon, Victoria, referred to later, I can only place as a probable specimen of G. leuconota. In Central Australia specimens were collected by Mr. Keartland on the Horn Expedition, and marked by Mr. North as belonging to G. tibicen. The "saddles" are feebly represented (narrow and disjointed) and belong to birds shewing reversion if G leuconota, "development" if G. tibicen, or hybridisation.

It is generally thought that G. tibicen and G. leuconota occupy different sides of the Great Dividing Range of Victoria. To an extent only that is so. Each of their young has been found

upon the other's so-called ground. While it may be proved some day that certain birds are hybrids to the north of the Divide in Victoria, it will not be easy to prove that the so-called hybrids in such a district as Western Port are hybrids. Special attention has been given to the magpies of this latter district by Mr. G. E. Shepherd, with the result that he has never seen other than G. leuconota. Of birds shot at Somerville, examples shew partial reversion to G. tibicen rather than hybridisation. That G. leuconota is always larger than G. tibicen is not so. Specimens shew the same dimensions.

Examples of G. dorsalis handed to me by Mr. A. J. Campbell have slenderer bills, but others collected by the writer near the same locality (Kojonup, W.A.) have bills as deep as those of G. leuconota, while one bill of G. leuconota is as slender and long as in G. dorsalis. Mr. Campbell now believes that the bird described[1] by himself as a typical adult female of G. dorsalis was a peculiar immature female, certainly it is not a typical adult female. Possibly it would not have developed beyond the second stage (saddle-back), in which case we would have a permanent black-back mated with a white-back in Western Australia.

Although Mr. Gould believed there was sufficient difference between the western bird and G. tibicen to form a new species, an examination of specimens by Dr. Ramsay led him to retain the bird in his Tabular List (1888) as G. leuconota.

The bulk of the black-backed birds appear to occupy the central part of the continent, while the white-backed occupy coastal positions on the eastern and western wings. Reversion, but mostly plumage development from a black to white back, I take it, works in all.

The various phases of G. dorsalis strongly support G. leuconota as being at the moment our standard magpie, and in placing G. tibicen as a phase of it, it is to be remarked the broad band on the back for one or more generations in some nesting-families remains persistent. The tendency of the fledgling is just as strong to shew a whole white back as it is in other cases to go through the second stage of showing a black band on the back,

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[1] Proc. Roy. Soc. Vict. 1895, p. 206.

or to persist in agreeing with what appears to be the old type in being nearly uniformly black upon the dorsal surface.

The following are measurements of the principal parts of specimens of each so-called species :—

G. LEUCONOTA, Gld.

	Culmen.	Wing.	Tail.	Tarsus.
	inches.	inches.	inches.	inches.
a^1 Ad. ♂ and ♀. British Museum specimens - - - -	2	10·2	6	2·3
b^1 Labelled ad. ♂. Morwell, Victoria	2·1	11·25	6·75	2·4
c^1 Adult ♂. Somerville, Victoria, 10/6/98 - - - - -	2·1	11	6·75	2·4
d^1 Adult ♀. Box Hill, Victoria, 1/12/99 - - - - -	1·9	11	6·25	2·3
e^1 Adult ♀. Box Hill, Victoria, 7/9/00 - - - - -	1·7	10	6	2·1

Specimens in the National Museum, Melbourne, shew the length of culmen to be in :—

(a) ♂ - - - 1·9 inches.
(b) ♂ - - - 1·9 inches.
(c) ♀ - - - 2·25 inches.
(d) ♂ - - - 2·2 inches.

While *(a)* is a male with a culmen less than 2 inches, *(c)* is a female with a culmen considerably more than 2 inches.

Specimen b^1 is an example of a phase having an appearance about the back that neither definitely indicates an adult female nor a hybrid. The soft brown mark appearing as if beneath the surface of the back are not those of a female bird, yet the adult male should have a clear white back as this nearly is. The marks are ancestral in appearance. The Brit. Mus. Cat. Birds, vol. viii., p. 93, refers to a similar specimen as "a bird in fully adult plumage with the middle of its back still mottled with pale silvery grey."

Specimen c^1 is a large male shewing a narrow "saddle" on the back (1 inch in diameter), and on the head, tail and sides of it a number of light brownish marks. In a district where there do not appear to be any living specimens of G. tibicen, these marks are most likely ancestral.

Of many specimens seen by Mr. G. E. Shepherd to shew variation in the district named, one was recorded in the Victorian Naturalist, Vol. XII., p. 68, as a probable new species or a hybrid. Mr. A. J. North[1] commented upon it and said, because of the great variation in the width of this band, which in some specimens is reduced to a narrow line of black feathers, the possibility of it being a species is precluded, but it may be due to atavism. This latter, however, is not Mr. North's view of the matter, "as no Tasmanian specimen is yet to hand shewing a marked deviation."

G. TIBICEN.

	Culmen.	Wing.	Tail.	Tarsus.
	inches.	inches.	inches.	inches.
A. Adult ♂. Murtoa, Victoria, 1898	2	10·25	6	2·2
B. Adult ♂. Murtoa, Victoria, 1898	2	10	6	2·2
C. Adult ♂. Murtoa, Victoria, 1898	2	10·5	6·25	2·2
D. Adult ♂. Murtoa, Victoria, 1898	2	10	6	2·15
E. Adult ♂. Victoria - - -	2·2	10	6	2·15
F. Adult ♂ and ♀. British Museum specimens - - -	2·1	10·6	6·5	2·3
G. Adult ♂ and ♀. British Museum specimens - - -	2·2	10·8	6·8	2·4
H. Adult ♂. Victoria, 1893 - -	1·8	10	6·25	2·1

Two specimens in the National Museum, Melbourne, have their culmens 1·85 inches in length, while others, described in the Zoologist, June 1900, by Mr. E. Degen, range between 1·8 and 2·25 inches.

The most important point of interest in the above specimens is in the series of different sized "saddles," ranging from the more ordinary one (3·65 inches in diameter) to the less ordinary one, 0·9 inch. Other recorded specimens have their saddles represented by scattered feathers that are not solid enough to form even a narrow solid "saddle." Some of the "saddle" feathers of specimen D are edged with white, which is not uncommon in places at least 1000 miles apart, and which are on the out parts of two of four boundaries (Southern Victoria and Central Australia).

[1] Report of the Horn Exp. Cent. Aust., Zool., p. 70 (1896).

Essendon, Victoria, is thought to be stocked with G. leuconota alone, yet the specimen marked J is a nearly mature female of a bird that could only be doubtfully marked G. tibicen, and preferably G. leuconota. It has a narrow "saddle" with a diameter of 0·9 inch, and carries the leading characters of two species, *i.e.*, the female back of G. leuconota and the female saddle of G. tibicen. There is nothing whatever to say it is not G. leuconota in the reversional stage. The dimensions are: culmen, 1·8 in.; wing, 10in.; tail, 6in.; tarsus, 2·25in.

Mr. A. McGregor, to whom I am indebted for the Murtoa skins, has shot the pure "white-backs" among the flocks of "black-backs." This tends partly to the theory of hybridism, but it does not support it by the results noted at Essendon, Morwell and Somerville, where an isolation of species appears to exist.

G. HYPERLEUCA, Gld.

	Culmen.	Wing.	Tail.	Tarsus.
	inches.	inches.	inches.	inches.
a^{11} Adult ♂ and ♀. British Museum - - - - - -	1·7	9·3	5·8	2·1
b^{11} Sk. ♀. National Museum - -	1·8	10	6·5	2

Specimens in the Australian Museum led Dr. Ramsay to consider this bird not a good species (Tab. Hist. Aust. Birds, 1888).

G. DORSALIS, Campbell.

	Culmen.	Wing.	Tail.	Tarsus.
	inches.	inches.	inches.	inches.
a^{111} Adult ♂. Kojonup, W.A. -	2	10	6	2·1
b^{111} Adult ♂. Kabanning, W.A., 6/10/99 - - - - - -	2	10	6	2·1

Mr. Campbell[1] gives the measurement of the longest culmen as 2·31 inches.

The bird referred to by Gould in his Tabular List (Folio, Bds. Austr.) as a doubtful specimen of G. tibicen doubtless is an

[1] Proc. Roy. Soc. Vict., N.S., vol. vii., 1895.

immature specimen of G. dorsalis, agreeing with one of my skins. It is a bird that, on first sight and without a knowledge of such a phase, might easily be mistaken for G. tibicen.

In the matter of comparison of the young with the adults, Gould says in his folio work that "the young of G. tibicen assume the plumage of the adult from the nest, and no change takes place from age or season."

The Brit. Mus. Cat. Bds., vol. viii., p. 92, remarks that (*a*) is a specimen of G. tibicen, with a back blackish, narrowly-tipped with grey; that (*b*) is a specimen of G. tibicen, with its neck patch not so well defined; the feathers of the hinder part of the neck being mottled with black; the feathers of the back, white-edged; rump feathers with white tips only, producing a mottled appearance. One of these juvenile skins is labelled Queensland, the other Australia. In one of my fledgling skins of G. leuconota there is a tendency to shew very little white, and that where it usually appears, on the neck and rump. The above facts alone are enough to shew that the fledglings and young of the eastern species are inconstant, like those of the western form, though to a more limited extent, judging by the small amount of material we have noted.

G. dorsalis shews its fledglings to be either almost wholly white-backed or black-backed, with phases varying between the extremes, while the immature birds, in certain cases, have distinct, though narrow, blackish "saddles." I should venture to say this phase is the bird referred to by Gould and Ramsay as G. tibicen, and altered (Tab. Lists) later by Dr. Ramsay to G. leuconota. It seems to me that the black-backed variety of Western Australia has not been able to hold its own, failing to become a species, and now merging, if not already so, into G. leuconota. In Central Australia the "black-back" exists, but with varieties and "white-backs," through the interior and on three sides of it. Whether the black-backed variety, at present strongly posted in the south-east of the continent, will fail to survive and become a species seems to me uncertain. On the extreme south-east of Australia and Tasmania the "white-backed" variety, as in Western Australia, has proved itself to be the fittest. Between Southern Victoria and Central Australia the law of natural selection is strongly working to make the

black-backed variety a species by keeping the amount of black in a large number of specimens a constant quantity.

At the present time it is very variable, almost giving way to a uniform white back, while the known white-backs in the same breeding paddocks appear to revert to and shew the same quantity of black saddle as in these small saddle-backs of the recognised black-backed species. From Minyip, Victoria, Mr. J. P. Eckert has forwarded the following note to me: "To your question whether the black-backed and white-backed magpies mate together, I reply, emphatically, yes. In fact, the greatest percentage of magpies in this district consist of what I consider cross-breds. An instance of this kind has been under my notice for several years. As mentioned above, a pair of black-backed magpies have been in the habit of rearing their young on trees near my house for upwards of ten years. A few seasons back a white-backed cock appeared on the scene rather late in the year and drove away the black-backed male. The nest had already been made and the hen bird commenced laying shortly afterwards and hatched a brood of three. When the young were about a week old, I found them one morning on the ground and dead. At first I thought that the banished mate might have taken revenge and destroyed the brood, but on second thought, knowing quite well how jealously all magpies guard their nest, I was positive that such a thing was almost impossible. Having found elsewhere young magpies thrown out the nest, and, as Mr. J. A. Hill, my friend, had made the same observation, I put it down to the scarcity of food on account of the drought in that season. The old birds might have killed their young to preserve their own life. The following season *that same pair*, the black-backed female and the white-backed male hatched two young, one a *cross-bred* and one a *perfect white-back*. The white-back was thrown out of the nest and killed. Last year this same pair again built a nest quite close to the house and hatched a brood of four, three *black-backs* and one *white-back*. By some accident the white-backed male was killed, and the black-backed returned immediately to his former spouse, but next morning I found the white-backed young bird, which was all but fledged, thrown out. I replaced it again, but it was no time before it was out again. Seeming to be all right, I placed it underneath the tree where

the nest was, but the old birds took no notice of it. What puzzles me in this case is breeding true to colour in such cross-mating? Had the colours been mixed, explanation would not be difficult. What are we to call the offspring in such a case, pure-breds or cross-breds?"

If the case of the black and grey crows of the Old World is one of dimorphism, this is one of polymorphism, because of the bills and backs and dimensions other than those of sexual characters.

The position of the genus, as I see it, is represented by one species only, G. leuconota, Gld., with one variety, namely, that having a black back, at present known as G. tibicen, Lath. Where the variety begins and ends with the series of specimens exhibited, one cannot well say.